1. (Previously Presented) An apparatus for irradiating a sample, comprising:

a) an interferometer forwarding an electromagnetic radiation;

b) a sample arm receiving the electromagnetic radiation, the sample arm including an arrangement which is configured to produce at least two radiations from the electromagnetic radiation so as to irradiate the sample, and to delay a first radiation of the at least two radiations with respect to a second radiation of the at least two radiations;

c) a reference arm providing a further electromagnetic radiation, wherein the interferometer receives the first, second and further radiations, and forms a resultant signal based on the first, second and further radiations; and

d) a processing arrangement generating a first image based on the first radiation, a second image based on the resultant signal and a further image based on the first and second images,

wherein the first and second images are different from one another, and

wherein the further image has a signal to noise ratio that is improved according to the equation:

$$SNR_{ACPE} = \frac{\langle S_{OCT} \rangle}{\sqrt{\mathrm{var}[S_{OCT}]}} \propto \frac{\sum_{i=1}^{N} u_i}{\sqrt{\sum_{i=1}^{N} u_i^2}}.$$

wherein SNR_{ACPE} is the signal to noise ratio, S_{OCT} is an amplitude of a high-pass filtered OCT signal that is associated with the resultant signal, *m* is a thickness of the arrangement, u_i is an amplitude of a demodulated OCT signal that is associated with the resultant signal at a spatial location, and N=2m-1.

Claims 2 and 3 (Cancelled).

4. (Currently Amended) The apparatus according to ~~of~~ claim 1, wherein the further image has a noise that is smaller than a noise of the first image and a noise of the second image.

Claim 5 (Cancelled).

6. (Previously Presented) The apparatus according to claim 1, wherein m=2 and N=3 images associated with the at least two radiations are obtained.

7. (Previously Presented) The apparatus according claim 1, wherein the further image is generated based on a mathematical combination of the first and second images.

8. (Previously Presented) The apparatus according to claim 1, wherein the arrangement irradiates the sample by the first irradiation at a first angle, and by the second radiation at a second angle, the first and second angles being different from one another.

9. (Previously Presented) The apparatus according to claim 8, wherein the first and second angle are different from one another as a function of the delay and at least one of a phase or a incident angle of each of the first and second radiations.

10. (Previously Presented) The apparatus according to claim 1, further comprising a detector which detects the first electromagnetic radiation, and forwards the detected energy to the processing arrangement.

11. (Previously Presented) The apparatus according to claim 1, wherein the arrangement includes two sections, each being configured to delay a respective one of the first and second radiations, and wherein a delay of the first radiation is greater than a delay of the second radiation.

12. (Previously Presented) An apparatus for irradiating a sample, comprising:

a) an interferometer forwarding an electromagnetic radiation; and

b) a sample arm receiving the electromagnetic radiation, the sample arm including an arrangement which is configured to produce at least two radiations from the electromagnetic radiation so as to irradiate the sample, and to delay a first radiation of the at least two radiations with respect to a second radiation of the at least two radiations, wherein the delay of a path of the first radiation compared to a path of the second radiation is at least 500μm in air.

13. (Previously Presented) The apparatus according to claim 12, wherein the delay of the path of the first radiation compared to the path of the second radiation is at least about 1 mm in air.

14. (Previously Presented) An apparatus for irradiating a sample, comprising:

a) an interferometer forwarding an electromagnetic radiation; and

b) a sample arm receiving the electromagnetic radiation, the sample arm including an arrangement which is configured to produce at least two radiations from the electromagnetic radiation so as to irradiate the sample, and to delay a first radiation of the at least two radiations with respect to a second radiation of the at least two radiations, wherein the arrangement has at least one of:

- first optical section with a refractive index of at least 1.5, the first section being structured to propagate the at least two radiations,
- a second section which has silicon, the second section being structured to propagate the at least two radiations.

15. (Previously Presented) The apparatus according to claim 14, wherein the refractive index of the optical section is at least 3.0.

Claims 16 and 17 (Cancelled).

18. (Previously Presented) The apparatus according to claim 14, wherein at least one of the first section or the second section comprises an anti-reflection-coated BK 7 glass.

19. (Previously Presented) The apparatus according to claim 18, wherein the glass has a thickness of from about 1.6 mm to about 7.7 mm.

20. (Currently Amended) The apparatus according to claim 14~~18~~, wherein at least one of the first section or the second section comprises an anti-reflection-coated ~~the~~ glass that has a refractive index of from about 1.51 to about 3.5.

Claims 21 and 22 (Cancelled).

23. (Previously Presented) A method for irradiating a sample, comprising:

a. providing an electromagnetic radiation from an interferometer;

b. in a sample arm, producing at least two radiations from the electromagnetic radiation so as to irradiate the sample, a first radiation of the at least two radiations being delayed with respect to a second radiation of the at least two radiations;

c. providing a further electromagnetic radiation, wherein the interferometer receives the first, second and further radiations and forms a resultant signal based on the first, second and further radiations; and

d. generating a first image based on the first radiation, a second image based on the resultant signal and a further image based on the first and second images,

wherein the first and second images are different from one another, and

wherein the further image has a signal to noise ratio that is improved according to the equation:

$$SNR_{ACPE} = \frac{\langle S_{OCT} \rangle}{\sqrt{\mathrm{var}[S_{OCT}]}} \propto \frac{\sum_{i=1}^{N} u_i}{\sqrt{\sum_{i=1}^{N} u_i^2}}.$$

wherein SNR_{ACPE} is the signal to noise ratio, S_{OCT} is an amplitude of a high-pass filtered OCT signal that is associated with the resultant signal, m is a thickness of the arrangement, u_i is an amplitude of a demodulated OCT signal that is associated with the resultant signal at a spatial location, and N=2m-1.

24. (Previously Presented) An apparatus for imaging, comprising:

a. a sample arm receiving an electromagnetic radiation, the sample arm including an arrangement which is configured to produce at least two radiations from the electromagnetic radiation so as to irradiate a sample, and to delay a first radiation of the at least two radiations with respect to a second radiation of the at least two radiations;

b. a device receiving the first and second radiations from the sample arm and at least one third radiation from a reference arm, wherein the first and second radiations interfere with the third radiation;

c. at least one ~~of~~ spectral separating arrangement ~~unit~~ which cooperates with the sample arm, and separates spectrum of at least one of the first, second and third radiations into frequency components; and

d. at least one detection arrangement including a plurality of detectors, each detector capable of detecting at least a portion of at least one of the frequency components;

e. a reference arm providing a further electromagnetic radiation, wherein the interferometer receives the first, second and further radiations, and forms a resultant signal based on the first, second and further radiations; and

f. a processing arrangement generating a first image based on the first radiation, a second image based on the resultant signal and a further image based on the first and second images,

wherein the first and second images are different from one another, and

wherein the further image has a signal to noise ratio that is improved according to the equation:

$$SNR_{ACPE} = \frac{\langle S_{OCT} \rangle}{\sqrt{\mathrm{var}[S_{OCT}]}} \propto \frac{\sum_{i=1}^{N} u_i}{\sqrt{\sum_{i=1}^{N} u_i^2}},$$

wherein SNR_{ACPE} is the signal to noise ratio, S_{OCT} is an amplitude of a high-pass filtered OCT signal that is associated with the resultant signal, *m* is a thickness of the arrangement, u_i is an amplitude of a demodulated OCT signal that is associated with the resultant signal at a spatial location, and N=2m-1.

Claims 25 and 26 (Cancelled).

27. (Previously Presented) An apparatus for obtaining information associated with a sample, comprising;

a first arrangement configured to separating at least one first electro-magnetic radiation into a first radiation and a second radiation forwarded to a sample, wherein the first and second radiations having different path lengths;

a second arrangement configured to received third and fourth radiations from the sample associated with the first and second radiations and a fifth

radiation received from a reference, and generate at least one interference signal as a function of the third, fourth and fifth radiations;

a third arrangement configured to generate:

- first data associated with the third radiation which includes a first speckle pattern and second data associated with the fourth radiation which includes a second speckle pattern, and
- third data associated with the sample based on the first and second data that has a speckle pattern the amount of which is smaller that the amount of at least one of the first speckle pattern or the first speckle pattern.

28. (Previously Presented) The apparatus according to claim 27, wherein the first, second and third data are images.

29. (Previously Presented) The apparatus according to claim 27, wherein the first arrangement includes an optical section with a refractive index of at least 1.5, the optical section being structured to propagate the first and second radiations.

30. (Previously Presented) The apparatus according to claim 27, wherein the first arrangement includes a section which has silicon that Is structured to propagate the first and second radiations.

31. (Previously Presented) The apparatus according to claim 27, wherein the first arrangement includes a section which has an anti-reflective coating on at least

one surface thereof, the section being structured to propagate the first and second radiations.

32. (Previously Presented) An apparatus for obtaining information associated with a sample, comprising;

a first arrangement configured to separating at least one first electro-magnetic radiation into a first radiation and a second radiation forwarded to a sample, wherein the first and second radiations having different path lengths;

a second arrangement configured to received third and fourth radiations from the sample associated with the first and second radiations and a fifth radiation received from a reference, and generate at least one interference information as a function of the third, fourth and fifth radiations; and

a third arrangement configured to generate data corresponding to an amount of a ranging depth within the sample associated with the second arrangement, wherein a difference between the path lengths of the first and second radiations is equal or greater than the ranging depth.

33. (Previously Presented) The apparatus according to claim 32, wherein the first arrangement includes an optical section with a refractive index of at least 1.5, the optical section being structured to propagate the first and second radiations.

34. (Previously Presented) The apparatus according to claim 32, wherein the first arrangement includes a section which has silicon that Is structured to propagate the first and second radiations.

35. (Previously Presented) The apparatus according to claim 32, wherein the first arrangement includes a section which has an anti-reflective coating on at least one surface thereof, the section being structured to propagate the first and second radiations.

36. (Previously Presented) The apparatus according to claim 32, wherein the ranging depth is a penetration depth in the sample, the sample including an anatomical structure.

37. (New) The apparatus according to claim 27, wherein the first, second and the third data are images, the third image data having a noise that is smaller than a noise of the first image data and a noise of the second image data.

38. (New) The apparatus according claim 27, wherein the first, second and the third data are images, and wherein the third arrangement is configured to generate the third image data based on a mathematical combination of the first and second image data.

39. (New) The apparatus according to claim 27, further comprising an arrangement which is configured to irradiate the sample by the first irradiation at a first angle, and by the second radiation at a second angle, the first and second angles being different from one another.

40. (New) The apparatus according to claim 39, wherein the first and second angle are different from one another as a function of a delay between the first and second radiations and at least one of a phase or a incident angle of each of the first and second radiations.

41. (New) The apparatus according to claim 27, further comprising a detector which detects the first radiation, and forwards the detected energy to the third arrangement.

42. (New) The apparatus according to claim 27, further comprising an arrangement which includes two sections, each being configured to delay a respective one of the first and second radiations, and wherein a delay of the first radiation is greater than a delay of the second radiation.